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ABSTRACT

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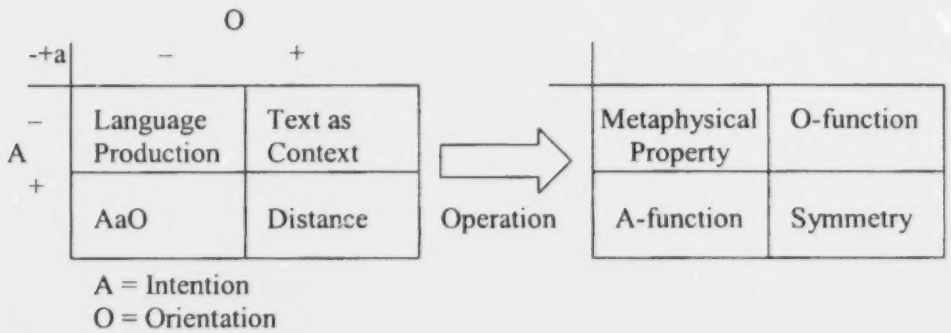
Abstract

The Agent-action-Objective (AaO) axiom and the theory of rotational dynamics constitute the frame of reference for the study of the metaphor as instrument for the direct perception of events. Its major hypothesis refers to the event structure embedded in the ground of a metaphor. Since the ground is implicit in the linguistic manifestation, an invariant representation of textual movement patterns is assumed to capture the event structure. Experimentally, it is demonstrated that an event is perceivable only through structure. To capture the event means to conserve its structure through informational invariants. As a result, it is demonstrated that the functional symmetry of a metaphor can be established in the form of state attractors evolving in attractor spaces.

The classical approaches into the functioning of metaphorical properties (Ortony, 1979; B. Bierschenk, 1991; 1994) have followed two lines. The first concerns the linguistic form and semantic interpretation as well as the literary explanation. Here, the focus will be on linguistic rules and their possible adaptation. The second line has been focused on the metaphor as cognitive instrument. Hence, the problems that pertain to the choice of criteria for the determination of what constitutes a metaphor will be highlighted. In relation to the experimental variables the present article concerns the metaphysical control of intention and orientation. Thus, the course of the developing discussion will be directed towards a configuration, which makes obvious a qualitative leap concerning the experimental variables and the variables of measurement. As marked in Figure 1, the cooperation between "intention" and "orientation" will no longer be the objective of a literal and consequently physical interpretation.

Figure 1.

Establishment of Metaphysical Quality



A = Intention
O = Orientation

Instead, it is the virtual, i.e. metaphysical determination of the terminal states that will come into focus. What makes the present approach to the functioning of metaphysical properties different from classical approaches into the functioning of "metaphorical properties" is the treatment of the AaO as building block in the coupling of text kinematics with the resonating structure of a metaphor. It follows that a most significant advantage of this approach can be made manifest if it is possible to manifest the AaO units for the formation of metaphysical circumstances. This implies that the functional aspect of the coordinated emergence of the involved A- and O-functions can be identified and tested according to the following hypothesis 1:

Hypothesis 1. A fluid form of indexing the metaphysical properties of rotational string dynamics provides for an exact characterisation of the relationship between the A- and the O-function.

According to hypothesis 1, the topic to be treated concerns the metaphysical coupling between intention and orientation. Hence, the idea behind the fourfold table of Figure 1 is that non-linear dynamical states are responsible for the metaphysical determination of a whole configuration of terminal states. Further, besides enabling an invariant formulation of the involved A- and O-function, the instrumental aspect of any language expression is transcending various contextual constraints and thereby establishing the metaphysical

boundary conditions. Thus each control level of the preceding phases is defined by a dynamic system of self-organising A's and O's, which is producing the corresponding boundaries as levels of constraints, or control constraints.

Since the AaO axiom and the theory of rotational dynamics constitute the frame of reference for the study of the metaphor as instrument for the direct perception of events, the second hypothesis refers to the event structure embedded in the ground of a metaphor. However, since the ground is implicit in the linguistic manifestation, an invariant representation of textual movement patterns is assumed to capture the event structure. Therefore, the second hypothesis behind the present approach is the following:

Hypothesis 2. The functional distance of a metaphor gives expression to the rotational dynamics, which as a consequence is manifesting functional symmetry.

Experimentally, it will be demonstrated that an event is perceivable only through structure. To capture the event means to conserve its structure through informational invariants. As a result, it will be shown that the functional symmetry of a metaphor can be established as a function of the distance between state attractors evolving in attractor spaces.

As a background, some conventional strategies and the effects of contextualisation will be presented in order to introduce the user-perspective. Since implicit figuration and subjective interpretation make up the basis, the classical discussion has been concentrated on aesthetic qualities and the comprehensiveness of metaphors. But its functioning and use in the social sciences will be illustrated through the work of Schön (1979), who has introduced the concept of a "generative metaphor" as instrument for an analysis of "phenomenological perception". However, the major part of the review will be devoted to a series of studies, which Verbrugge and McCarrell (1977) have carried out. These authors have taken their point of departure in the common understanding of the metaphor and consequently concentrated on the characteristics of the ground of the metaphor. But the authors postulate instead of common "emotional qualities" the existence of "structural resemblance". With this reorientation, the experiments were meant to give evidence for the "ecological significance" of the metaphor. Especially Verbrugge's (1977) ecological approach to metaphoric comprehension and his hypothesis of direct perception of event structures, embedded in the ground of a metaphor, has given rise to a critical investigation into the author's understanding of structural invariance.

One significant difficulty for Verbrugge and McCarrell will be shown to consist in their analytical strategy, i.e., to know whether they have been able to demonstrate the comprehension of metaphors, and consequently whether they have been able to capture the structure in the ground specification. This uncertainty appears to be connected to an intuitive feeling of having lost the natural unity of the metaphor. Since structural unity by necessity gets lost in the experimentation itself, they have actually studied dependency between the components instead of their cooperation. What will be pointed out here is the obvious decomposing tendency in their variable construction, which seems to be the result of a confusion of analytic-descriptive relations with synthetic-reflective higher order relations. With an ecological approach to the perception of events, the review will show that the authors have revealed a misconception, since transformation concerns both structure and form. Otherwise, they should have made a distinction between structural and formal (or logical) invariance.

Further, Gibson's theory of perception is emphasising the existence of ecological invariants. His "ecological optics" provides the foundation for the assumption that perception is lawful. It will become obvious that this position is at odds with Verbrugge and McCarrell's emphasis on circumstance-dependent cues (hints, or guides) and on perception as inference.

The central concept of ecological optics is the ambient optic array at a point of observation. To be an array means to have an arrangement, and to be ambient at a point means to surround a position in the environment that could be occupied by an observer (Gibson, 1979, pp. 63-64).

Fundamental to Gibson's ecological approach is the theoretical position that perception is based on the organism's terrestrial environment, which has structure. Starting from structural invariance, called affordance, he formulates the hypothesis that the organism needs to have developed a mechanism that makes orientation possible through the perception of environmental "reflectance" (Gibson, 1979, pp. 30-31). The way reflectance is emerging in a medium such as air and water must be suitable for the particular organism. The difficulty with a direct transference of this definition to the metaphor is that the presence of an event structure in a metaphor is hard to make evident. At the same time, it is difficult to imagine how this continuity in the environment may effect the organism's action. Therefore, the effort in the review will be put on a critical discussion in order to make explicit how the metaphor may be used as a means through which the environment can be made known, despite the fact that the medium for reflecting event qualities structurally is the relationship between the A- and the O-function. But the result of the working of these functions will become manifest only to the degree that the attractor spaces of their pronunciation can be reconstructed. Hence the investigation of the space-hypothesis will be based on the third hypothesis:

Hypothesis 3. Emergent metaphysical properties can be identified and made manifest only if the concept of "functional quality" can be made operational.

But contextual constraints of a textual surface always imply the AaO mechanism that can transcend these constraints and pick up its system properties. It follows that functional quality can evolve only in the presence of this mechanism. Since it has been possible to show that text building behaviour is generating the morphology of text and this morphology is the product of textual evolution, it must be concluded that metaphysical qualities necessarily are the result of text production (B. Bierschenk, 2001).

Conceptual Symmetry

In the trace of the development of human sciences, language production became almost the only tool for describing mental phenomena. With regards to the capabilities of natural language production to designate mental processes and states, different schools developed over centuries. And philosophers, scientists and other thinkers have been attracted to questions of concern in the analysis of language and what it signifies in relation to reality and thought. For, if language can mediate both information from reality and thoughts about reality, then how can one know for sure that a certain verbal expression has its true referent in what is known and not only looks like as if it were known?

A "scientific" requirement on language use is the non-ambiguity approach, that is, it shall be capable of describing a reality, preferably physical, as objectively as possible. In short, language shall be taken literally. The bearing idea in those discussions seems to be the degree to which linguistic rules can be accepted to adapt to realities of different abstractness and to be redefined correspondingly. It follows that this conduct is historically and theoretically consistent with the requirement that a strictly formal science must be less tolerant to non-literal or non-mechanistic approaches to this problem. This circumstance may also serve as an explanation to why metaphoric language has not lied within the scope of linguistics, whether it concerns theories of language itself or of language use. Artistotle's view of metaphoric expressions as exclusively ornamental puts metaphor into the scope of

literature, poetics, rhetoric, and also politics, whose most typical expressions are characterised by violation of linguistic rules.

With the computational approach to language study text from, among others, these fields have been studied with the purpose of capturing what they are about, that is, their "content" or "meaning", and also how they are composed, whereby rules of linguistic kind have helped to detect variability and re-currency. It has been evident that regardless of what syntactic or semantic model is applied on textual analysis, they are of very little help for extracting "meaning" out of literary text. So, linguists and other "text-workers" have turned to the study of metaphor, since expressions of this kind have proved to be highly informative in being a tool for gathering non-trivial aspects of reality.

Conceptions of the Metaphor

From what can be seen in modern reading about metaphors or metaphoric language the area is indeed multi-facetted. The notion "metaphor" seems to cover several aspects pertaining to resemblances of different kind. Resemblance is literally defined as the "condition or quality of resembling something; similarity in nature, form or appearance; likeness" (Morris, 1970, p. 1106). In this section "metaphor" will be used to cover those variations.

In principle, two lines of reasoning may be discerned regarding studies of the very nature of metaphors. Along one of them it concerns theoretical assumptions of the mechanism necessary to explain why a metaphor functions the way it does. Along the other its use is studied, for example, how it is employed in scientific language, in social life, or in learning situations including multicultural perspectives. For an overview of those lines, see for example Ortony (1979). Of special interest for the present exposition is the second line from which a couple of studies will be presented with the purpose to explain phenomena in those scientific and social contexts where the metaphor is used for problem setting and solving. However, the first line has produced most of the existing works on the subject and will, therefore, only serve as introduction to a discussion of what it is that transforms a verbal expression into a metaphor.

The principles picked up for this presentation should not be regarded as conflicting theories, nor should they be conceived as chronological consequences of one another. Rather, their task is to guide the specific way of treating language in an attempt to look into cognitive depth. As will become clear, both linguistically and psychologically oriented theorists have abandoned the ornamental view of metaphors and agreed on the metaphor as a "cognitive instrument", but, of course, with different explanations.

Thus, when Black (1979, p. 25) states that there can be no dictionary of metaphors, this must be taken as a most striking example of the metaphor as lying outside the scope of grammar. He is discussing metaphoric language from the point of view of creation, that is, the literary definition of metaphor, for which no rules for violation can be set up. Thus metaphors make possible to express "an insight" that cannot be expressed in another way except with longer formulations. This argument may be further amplified with Sadock's (1979, p. 49) observation that because of some metaphors being so obvious that they show up in several languages, they "might be misdescribed as a universal tendency of language rather than a natural tendency of thought".

Polanyi and Prosch (1975) noticed that Black has "tacit understanding" of metaphor but fails to unravel "this secret explicitly". These authors have analysed Black's approach from a holistic point of view, which converges into an explanation of the metaphor as a "focal object" into which experiences of our own lives are symbolised and "carries us away" by a "powerful and moving image". Through examples from world literature these authors exemplify how our diffuse experiences can be seen as integrated through a metaphor. The

following lines from Shakespeare's Richard II very well serve this purpose by which Richard defies the conspiring enemies:

Not all the waters of the rough rude sea (1)
Can wash the balm from off an anointed king.

Taken non-metaphorically, that is, if Richard had made a more explicated statement about the inviolability of his kingship, the passage becomes foolish, not moving at all. Through the perspective of self-centredness, Polanyi and Prosch, adopt Black's view of the metaphor as cognitive instrument, but not his relative distance in trying to explain it.

It is this non-literal view that led Lakoff and Johnson (1980, p. 10) to discuss the metaphor in terms of the systematicity that allows us to comprehend "one aspect of a concept in terms of another". Grounded in root-metaphors, which can expand into thesauruses of metaphors, the authors define such a system in terms of coherence and consistency. Connections between metaphors are more likely to involve coherence than consistency. The basic idea is that three types of metaphors are capable of organising a system.

The first is called "orientating" metaphor, since it has to do with spatial orientation: up-down, front-back, on-off etc. A basic metaphor of this kind would be "Good is up". The second type is "ontological", as in "The mind is a container" and the third type is called "structural" as in "Understanding is seeing". It is not difficult to read out an influence from the phenomenon of proverbs by which people live or at least express their orientation when faced with a situation that is difficult to handle verbally otherwise.

Because, the "striking familiarity" or "flash of insight" often referred to as the instrumental function of a metaphor can hardly be the effect of the approach of Lakoff and Johnson. Instead of freezing a cultural memory, as in the well-known examples "the sunset of life" and "man is a wolf", the expressions exemplified are taken from basic logical or psychological domains of life. The concepts are at most semantically rooted in the line function. As theoretical explanation of the nature of a metaphor the image (consistency) underlies the thesaurus classification.

From the point of view of semantics, metaphors as "figures" of language must necessarily be treated as an extra linguistic phenomenon, because linguistic problems arise in the second of the following two examples:

He is brave as a lion (2)
He is a lion in battle (3)

The features of comparison are implicit in the second and must be "figured" or inferred from semantic knowledge. Cohen (1979) is distinguishing between "empirical" (immediately evident) features and "inferential". He then proposes that in a literal sentence, the inferential features are cancelled whereas in metaphorical sentences the empirical features are cancelled. As a consequence, the second example is a metaphor, although the "analytical urge" operates in both cases. In the statement "He is a lion", a model of semantic features would urge the reader or listener to infer whatever feature of lions could be attributed to "He". Cohen (1979, p. 65) therefore claims that it is the "richness" in possible meaning" of a natural language sentence that constitutes its metaphorical nature. Then, from a processing point of view, interpretation would be a basic component in a theory of metaphor, because the example sentences have to be enriched with meaning. This at least requires textual referents and not extra-linguistic ones. In other words, the process of comprehending is involved in the definition.

Problems of analogy have been the starting point in Sternberg, Tourangeau and Nigro's discussion of metaphor. The key to their approach will be exemplified with the following design, typical of analogy items in IQ-tests:

Analogy	(A) Chimpanzee, (B*) Cow	(4)
Rat: Pig::Goat_____;	(C) Rabbit, (D) Sheep	

Thus, the key to understanding this example is that there is no choice of animal that would be ideal. According to the authors, the closest are in this order (B), (D), (C), and (A). Therefore, it is discussed how the missing semantic concept making the analysis complete can be represented in three semantic dimensions. Based on this example, conventional strategies, for example, the possibility of "similarity scaling" are considered. But such a procedure would quickly become impractical, because of the great number of objects and combinations that would be involved in the testing. The authors instead chose an alternative, which is the well-known "Semantic Differential" technique. It follows that a scaling has been chosen in which each concept in the analogy is represented as a function of what kind of semantic differential has been selected.

The idea behind this approach is that comprehensiveness and aesthetic quality of a metaphor can be measured and represented psychometrically an variance analytic terms. The hypothesis put forward is that a "within-subspace" and between-subspace distance can be superimposed. Consequently, a small within-subspace distance would mean that the metaphor is easily comprehended and regarded as aesthetically more pleasing as compared with a metaphor of increasing distance. A small between-subspace distance, on the contrary, is assumed to work against the aesthetic quality. The authors have exemplified a possible outcome of their proposal with the following design:

Table 1.

Psychometric Approach to the Measurement of Distance in a Metaphor

Metaphor	W-distance	B-distance
A wild-cat is an ICBM[1] among mammals	small	Large
A wild-cat is a hawk among mammals	small	small

[1]ICBM: Intercontinental Ballistic Missile

The interpretation of the constructors of these examples is that the first one represents an aesthetic metaphor of high quality. In contrast, the second one carries a non-aesthetic (trivial) and consequently low quality, although it is high in complexity. The reason for using this method is that the authors speculate about the existence of conceptual borders, which could be defined this way. In placing concepts in a semantic space, it is expected that components can be set up in order to determine the distance between super- and subordination. Hence, the aim has been to use the metaphor as part of a strategy that has the capacity to organise the semantic space. But the ground on which this aim rests is the emotional evaluation, that is, the dimensionality.

Since the metaphor cannot be understood literally, the theories of language or language use have not been influencing the meta-language of metaphor either. When Richard's (1936) proposed a terminology for talking about metaphors, "topic" or "tenor" for the first part was taken from rhetoric, i.e., the matter or argument and the uninterrupted "flow of meaning" as a more general sense, the one that holds, as in the musical composition of an

opera. The second part was assigned the notion "vehicle", which is a general notion for carrying or transmitting anything from one place to another. These notions evoke a static image of something characteristic being moved over from one holder and projected onto another holder, making this new holder look different compared to its usual appearance. The apparent conceptual incompatibility of tenor and vehicle is called the "tensive view", which refers to the affective or emotional quality as a result of the projection. The underlying reason for the metaphor is named "ground". Thus, it is easy to understand why the effect of the metaphor is seen as a figure, and why studies of the cognitive anchorage of metaphors are carried out with reference to figurative thinking and analogical reasoning.

Contextual constraints

Underlying most models of language understanding are theories of association, which in the case of metaphors, in principle, express the following perspective on the processing. Humans categorise reality in terms of primitives or semantic features or properties, which are somehow sensed through the elements of language. This presupposes a dichotomy between reality and linguistic rules. Grammatical categories can be set up augmented with so called distinctive lexical features and selection restriction rules for the processing. However, the model of the well-formed sentence performance could not constitute the ground for processing the syntactic and semantics characteristic of the reality of language in use, often referred to as imprecise, ambiguous, creative, in short, rule violating.

Talking about natural language always implies a user, who may be discerned as a knower, who has the meta-knowledge, and an understander or applier, who has the processing knowledge. (The speaker in this connection may refer to both categories.) It is the last sense of language user that has been focussed upon in modern linguistics. With respect to metaphors, then, some developments in semantics may be of concern, since the user perspective necessitates new criteria for word use imposing contextual constraints on their definitions.

The conceptualised approach fuzzes the lexical specification, especially when one considers the problem of defining meaning over texts and time, a course during which the dynamics of the user cannot be left unconsidered. When context is taken empirically a double binding is assigned such that a literal understanding may be intermingled with a so called figurative, and here the problem is to sense only one or both. This is the case in proverbial statements like "Bees give honey from their mouths and stings from their tails" (Honeck, Voegtle, Dorfmueller, & Hoffman, 1980). Thus, when semantic theories are enriched with context symbolic and conceptual understanding is indirect. It is this view on the nature of linguistic construction that is thought to blur the sensing or figurative process and, therefore, it is clear that "figure of speech", "figurative language", "metaphoric language", and so on refer to expressions of "implicit figuration" for which the ground is inferred or subjectively interpreted. This subjectivity alerts emotions in the understander, which may be infected by personal values (employed in the experimental design of Sternberg, et al., 1979) or may be sensed as a more or less trivial similarity assignment depending on aesthetic experience. With this background in mind, the following figures are similes:

He is as strong as a lion	(5)
He is a lion in battle	(6)
He runs as fast as a cheetah	(7)

If one supposes that what "He" designates is something known as to possible features and properties, a simile is characterised by both terms being known when the sentence occurs. However, some new characteristics are mediated about the first, whose nature is being

thought of as similar to the ones of the second. Thus they are chosen as help in describing the first. Just like concrete features and properties can be perceived in objects of perception they get their correspondence in semantic fields, which is the root of the figuration simile.

As may be sensed from the examples, both context and linguistic form of expressing the similarity relation may be implicit. From a contextual view, this means that the basic requirement for a simile to be recognised is the two known elements being mapped. The form only serves as logical connection (is/are; like; as ... as, and equivalent functions), which may be detected as in any natural language expression.

The Simile in Use

Schön (1979) introduced the term " generative metaphor" with the understanding of a metaphor as providing a way of looking at things. It allows a perception of two different objects simultaneously, which belong to two different domains, called frames. By the exposure a "seeing as" takes place, which has as its effect that features of one frame become regrouped paving the way for the new seeing. The generative metaphor is thought to be an instrument for re-thinking in expert's problem setting within social policy making, but Schön starts with exemplifying his term by comparing it with a case of technical problem solving:

A paintbrush is a kind of pump (8)

The effect of this carrying over has led researchers to construct a better kind of paintbrush, since the features of pump to be mapped onto those of a paintbrush, such that the space between the bristles come into the foreground as channels. The frames of the two objects are different (Schön throughout uses the notion "conflicting frames") and without the double exposure they could not interact in generating the new pump-working paintbrush. It is quite clear from Schön's account of the process that it has not been direct. The researchers had to work before their invention was complete, i.e., changing the positions of the bristles to make functioning channels.

Schön obviously makes explicit reference to psychological experiments of contour coding especially what has been well-known by the name of figure-ground perception in Gestalt theory. Schön (1979, p. 274) makes the statement:

> ...two different ways of seeing (...) are made to come together to form a new integrating image; it is as though, in the familiar gestalt figure, one managed to find a way to see both vase and profiles at once!

In a note he explains that an integrated image would be to see the profiles "pressing their noses into a vase" (Schön, 1979, p. 283).

In Gestalt psychology a general approach has to do with the manipulation of a figure whose area, like a field, may have its shapes reorganised. The ground is shapeless and usually extends beyond the figure. Thus, perception of the shape or a drawing depends on the laws of organisation, which raises the question of what makes the shape of the particular areas to be seen as figure and what makes them to be seen as ground. If Schön understands the line function in the same way as Atteneave (1971) does, namely that "one line can have two shapes" instead of two meanings or functions, then it is not surprising that he elaborates on background and foreground implying depth perception, which lies outside the scope of the perception of ambiguous figures. Moreover, Hochberg (1978) has explicitly stated that perception research on the effect of background for design has not been carried out.

Phenomenological givens in social frames

In accordance with other writers on metaphor, Schön (1979, p. 259) presupposes a use of a language of seeing rather than describing, where seeing is used in the non-literal sense. Consequently, it is urged that attention becomes directed towards social events as they might be expressed through a metaphor. However, this way of "seeing through" is neither expressed nor conceptualised in Schön's discussion. His focus is on "seeing as", which is clearly understood from the argument about phenomenological perception (Schön, 1979, p. 259) from which he takes the metaphor for the "mistake". Like certain theories of semantics, language is viewed as a means of seeing the phenomenon, contextualising the objective world in the background.

Phenomenological perception, when used within the framework of social psychology (Asch, 1952), assumes the perception of stimuli or selective awareness to imply a "conscious experience", that is, "phenomenological givens" are hypothesised. It is the experience of such givens that attracts Schön, the mediate perception of phenomena, not an immediate (Shaw & Bransford, 1977). Such a perception is governed by the threshold values influenced by drives, values and familiarity in relation to the phenomenon. Schön adopts this hypothesis and employs it in diagnosing the expert's motivational disposition, that is, for selecting features of the phenomenon under debate.

Following this hypothesis of perception, the arguments concerning the conflicting frames and the supposed "restructuring" process can be elicited. Thus, underlying his conflict phenomenon are terms of the "Frustration-Aggression-Displacement" theory, expressing a social adoption of the theory of "Drive-Motive-Reduction", which in turn stems from the "Balance" or "Congruity" theory. Conflicting frames becoming integrated into a third means that the tension caused by the conflicting frames is channelled into a behaviour, which is not connected to the original one.

If, as response to selective perception, one adopts the "image construction" hypothesis it is easily seen that images or "stereotypes" (Schön, 1979, p. 265) reflect the projective nature of a frame. Depending on the differences in social and cultural anchorage of single experts, particular customs and other details are given the same role as groups of features, and so become incorporated into these stereotyped images. Therefore, Schön assumes that a particular subgroup selected is symptomatic for the intra-psychic determinants of the frame producer. It is not difficult to understand why Schön talks about a "normative leap" (Schön, 1979, p. 265). Because, his view is that when a stereotype has been established there is no longer a need for the existence of real differences in, for example, housing areas, in order for the stereotype to be revoked. Another term for this behaviour model is stimulus generalisation.

The argumentation is based on the widely defended view in social psychology that stereotypes are always wrong. This view is held independent of a definition of error. An adoption of it, therefore, can only be justified when, as in Schön's case, criteria for truth are correspondents in details – in the literal sense. If, on the other hand, stereotypes are understood as abstractions, that is, the poor man's factor analysis, then stereotypes carry real differences, void of false symptoms, and are in no need of any diagnostics or projective prescriptions.

In phenomenological perception, "incentives" is the notion for a motivational concept that relates the attractiveness or drive-reduction properties attached to a behaviour or goal. Thus, built into every frame, it is attached to the value of effectiveness of the goal or as a motive for behaving. Schön's (1979, p. 264) motivation for making this conception true also for policy making is the following. Every story (script) mediates a different perspective – not on reality but on the phenomenon – and represents a special way of seeing. The frame

functions as selection mechanism for what ingredients are to be incorporated into a script. Note that the frame does not place anything into its context, but is a means for contextualising of features. Scripts have the function of problem setting, i.e., they select for attention a few salient features and relations from what would otherwise be an "overwhelmingly complex reality".

One of Schön's examples of a social phenomenon being focussed on is housing. Urban problems, although assumed to be known in the 50's as "congestion", and in the 60's as "poverty", do not tend to "spring from solutions earlier set but to evolve independently as new features of situations come into prominence" (Schön, 1979, p. 261). This gliding in selection for attention is reflected in the underlying of different similes, which are then exemplified as "The slum as natural community" or "Blight and renewal". In these similes Schön focuses on two characters, which give rise to images, on the one hand the community as a natural body, on the other a hospital where non-healthy bodies are cured. It should be observed that the two characters do not have to be literally named in the script. The image is constructed. Their implicitness means that in correspondence with the way of viewing stereotypes the words must not necessarily be terms pertaining to hospital. Yet, it must be clear that the operations carried out in a hospital are true for the recommendations of curing given.

The Ground of the Metaphor

From the perspective of poetry, semantics, Gestalt psychology, or social psychology, there seems to be a common conception of metaphor whatever way it is looked upon. In the notions of figure or image, substitution or comparison, conflict or interaction, transfer or carrying over, the change as inherent nature and function of a metaphor is conceived as connected to immanence. Since in cases of widely debated phenomena or scientific concepts their lexical origin occupy a central place, it is reasonable to examine a wide-spread dictionary to trace the explanation to the immanent view on metaphor. Morris (1970, p. 825) defines "metaphor" in the American Heritage Dictionary as follows:

> A figure of speech in which a term is transferred from the object it ordinarily designates to an object it may designate only by implicit comparison or analogy as in the phrase *evening of life*. (...). The central term of this definition seems to be "transference", which suffices to explain the etymological interpretation of "meta-".

It is deduced from the Greek term of transference, which originated from metapherein, to transfer: meta- (involving change) + pherein = to bear. In sum, of obvious concern for the Anglo-saxon definition is to capture the composition (frames) of the metaphor and to approach it associatively and computationally. The normal case, namely, is that change is being related to objects indicating shifts.

However, the most interesting case of "meta-" is what the dictionary names as its third meaning: Beyond, transcending. "Transcend" primarily means to pass beyond (a human limit)", "to exist above and independent of (material experience or the universe)". Clearly, the definition of metaphor does not concern what is contained or seen through it but merely how it works. This means that the normal case of change must be abandoned for the non-normal referring to the transcendent character of the metaphor. Moreover, the Central European definition stresses the transcendental character of the metaphor. According to the Duden Fremdwörterbuch (1982), "meta-" means "ver-" as in "Veränderung" (in the sense of "Umwandlung"), which instead of transfer stands for transformation instead of transference. This transformation means transcending the all too concrete thing perspective by passing beyond it. For the interpretation of the definition this is to say that what is perceived is not

two objects, worlds, or systems, but an event, that which remains over transformation, usually referred to as invariance. In fact, it is favourable to conceive of metaphor as the instrument for making visible a unity of cognitive structure otherwise hidden for direct inspection. As a consequence, it is self-contained.

The ground of the metaphor is and contains the invariant structure. It calls for direct comparison and would therefore be suitable for an instrumental approach. An empirical approach to identifying the structure of what is comprehended is discussed in Verbrugge and McCarrell (1977).

Unfolding event structure

In a series of experiments on "metaphoric comprehension", Verbrugge and McCarrell discuss the "structure of resemblance" in terms of abstract relations characterising metaphoric grounds. When "resemblance" is used in this presentation it refers to the dictionary definition. Their methodological context is the one of prompted recall. Although they do not postulate recognition of pre-existing attributes associated with "topics" (their term for tenor), nor a transfer of such attributes pre-associated with vehicles. The authors concentrate on the ground whose characteristics might be the key to structural resemblance. Thus, instead of feature similarity they prefer to discuss the matter in terms of structural similarity between topic and vehicle domains or "schemata" (Verbrugge & McCarrell, 1977, pp. 525-526).

This starting point has consequences for the construction of metaphoric sentences in their experimentation. Since abstract relationships are central, this means that it is not appropriate to identify the ground relations with specific terms appearing in neither topic nor vehicle in the sentence. It is further assumed that the transcendent character is central for describing the structure of grounds. In the discussion of the authors, metaphoric comprehension, then, is equal to event perception, where a transformational invariant (a kind of transformation exerted over a structure, e.g., rotation) and a structural invariant (what the transformation leaves invariant, e.g., spherical shape) are assumed. Thus, a resemblance between topic and vehicle domains is different in the following two examples.

Tree trunks are straws (9)
Tree trunks are pillars (10)

Variation in relationships transformed depends on context, i.e., what noun-phrase might be constraining the comprehension. If this is "... for thirsty leaves and branches" only the invariants of straws are at work, expressed in the following ground:

Are tubes, which conduct water to where it's needed (11)

If the context is "... for a roof of leaves and branches", only the invariants of pillar is working, expressed as a ground like

Provide support for something above them (12)

This reasoning has been made the basis for the set up of four experiments in which grounds of different kinds were acting as prompts for recalls of "correct" topics and vehicles. For a discussion of these experiments and their implications, however, some more attention must be directed towards the metaphoric sentences discussed and used, in particular from the perspective of linguistic form and relationships drawn upon. The formal aspects, namely, have been governing the authors' definition of metaphor with respect to the experiments.

Construction procedure

Verbrugge and McCarrell (1977, pp. 494-495) start with stating what in their view constitutes metaphors as opposed to similes and analogies. In a metaphor the resemblance presupposes identity, whereas in similes and analogies a relation of similarity is directly asserted. Moreover, not every sentence must explicitly mention the resemblance under consideration, which means that the three components – topic, vehicle and ground – may vary as to their linguistic manifestation, although cognitively present. If one continues along this line, it would be possible to represent those variations as a linguistically based schema in which elements of metaphoric sentences get their fixed position. With some typical examples from Verbrugge and McCarrell such a schema might be filled as shown in the following Table.

Table 2.

Verbrugge and McCarrell's Construction of Metaphorical Sentences

Topic	Textual Condition	Connector	Vehicle	Environmental Condition	Ground
He	runs	as			Fast
		as	a cheetah		
The freeway		is like	a snake		
A car		is like	an animal		
My lawnmower		is	a wild animal		
The children	galoped			to the cafeteria	
Billboards		are	warts	on the landscape	
Tree trunks		are	straws	for thirsty leaves and branches	

Example one explicitly states which similarity relation is addressed, i.e., every necessary condition is mentioned, leaving nothing to be presupposed. Since the fastness is the only similarity focussed upon, some environmental condition is not necessary either. In comprehending this sentence, the process is likely to be such that the topic and vehicle interact in comparing the fastness of both, which should be known. In the second example, the multi-characteristics of both structure and form of a serpentine is the evident ground assumed to be imposed form the vehicle onto the comprehension of the topic. Therefore, the sentence of the third example is a more general case of the same type. According to the authors, it directs the attention to "systems of relationships" (e.g., energy consumption, respiration and sensory system). In this connection, it may be proposed, that the relative abstractness of the representatives in the topic and vehicle does not effect the categorisation of the sentence. Thus, abstract relations are characteristic of the grounds underlying any metaphoric sentence. Therefore, in the construction of a metaphoric sentence one should be aware of the formulation of the respective ground with respect to the linguistic appropriateness in expressing the event in question.

In similes and analogies the ground is occasionally made explicit, but is principally always implicit in "strictly defined" metaphors. A vehicle may be only alluded to as in example five, but has a cue in the textual context. As is seen from the schema, the topic is always manifested in a language formulation. Typical for metaphor as opposed to the others is the connector said to state the identity (equation), according to the authors. We therefore propose, that neither topic nor vehicle is the governing concept in perception of structural resemblance, but that there are environmental conditions present, which may be explicitly

stated in order for the information in the ground to be directly picked up. In that sense, it may be illustrative to examine the fourth example as to what ground is likely to be present. If it is an immediately perceivable event, then the behaviour of a lawnmower (in an otherwise peaceful garden?) shall be perceived, and in that case, it is ferocious roaring or cruel gorging or both. If this is a structure that holds for this ground, it could be said also about a wild animal. To test it one might try how it works by a transformational twist in which the environments are adapted to the topic:

A lawnmower is a wild animal in a flower bed (13)
A wild animal is a lawnmower on a chicken farm (14)

Or with the same environment:

A lawnmower is a wild animal in a peaceful garden (15)
A wild animal is a lawnmower in a peaceful garden (16)

In principle, it can be proposed that in a metaphor there are two carriers of identical remaining structure, which has to be taken as explanation of an environment being implicit. It is simply not necessary, because the sentence works directly. After all, lawnmowers as well as wild animals have restricted environmental conditions compared to, for example, the car and the animal in the third example sentence. Thus, some scene is immediately understood. This understood environment or scene is integrated in the names of the concepts, only with differences in perceived range of the two. In sixth sentence, such a scene is stated, which provides for perception of perspective or range, while the fifth sentence merely concerns a particular viewpoint more being part of an event than being a scene for its occurrence. Finally, the seventh sentence seems to indicate some closely related involvement, a self-fulfilling event structure.

For the experiments, Verbrugge and McCarrell (1977, p. 501) decide on two sentence forms, which they categorise as metaphor ("A is/are B") and simile ("A is/are like B"). It follows that "sentence form" stands for a linguistically manifesting and explicit stating of perceived resemblance. In the schema of Table 2, the types are represented by the sentences (2), (3), (4), (6), and (7), which will be referred to throughout.

Uniqueness of the Relationship in the Triad

The effort in Verbrugge and McCarrell's studies is centred on establishing the triad as a unity by letting the components vary. If they have a unique relation to each other, the ground as prompt should not recall this abstract relationship arbitrarily but only the relevant, which should be either transformational or structural. Further, if abstract relations are central to comprehension of metaphor, the formulation of the prompt is an important experimental condition. For a detailed account of materials, subjects, and procedure in the four experiments together with statistical data the reader is referred to the original article.

Grounds as effective prompts

The assumption made in the first experiment is that the ground states a property of the topic and therefore, serves as effective prompt irrelevant of the interpretation guided by the Vehicle. Two kinds of prompts were used: (a) a set of "relevant grounds", where each prompt is relevant to the sense of an acquisition metaphor or (b) a set of "irrelevant grounds", where each prompt is irrelevant to a particular metaphor but true for the topic. Two lists of metaphoric sentences were constructed, where topics were the same and vehicle varied. For

example, "tree trunk" appeared in both lists while "straw" appeared in one and "pillar" in the other.

Groups of subjects were presented with audio-taped sentences, composed from either list, and were then asked to recall (write down) the sentences, when prompted with written Grounds of either type. Correct scores were given for (a) recall of both topic and vehicle, (b) recall of the central noun from the original topic or vehicle noun-phrase (conditions in Table 2), and (c) paraphrases with close synonyms for topic or vehicle terms and reversed order.

Special attention has been drawn to avoiding systematic intrusions in recall, which means that both pairs of grounds as well as pairs of metaphors should be as non-related to other pairs as possible. Also words in the ground were avoided which could constrain subjects' attention to either topic or vehicle. Thus, in an acquisition list the environmental field was not included in the vehicle prompt if, as the authors word it, "a word or phrase (...) was related to the topic domain" (Verbrugge & McCarrell, 1977, p. 502). The kind of relationship is exemplified with the seventh example sentence: "leaves and branches", which are part of a tree trunk. Evidently, this decision stems from the hypothesis of experiment 1, that grounds state the "properties" (features) of the topic. One may draw the conclusion that the sixth sentence example should pass because of landscape not being a property of billboards, and that, here, one finds oneself faced with intrusions of assumptions of semantic features contrary to the goals.

The results of the first experiment clearly indicate that the grounds were effective prompts only when subjects had heard the relevant metaphor. According to the authors, only a few cases show high recall of the irrelevant metaphoric sentence, a result very difficult to explain away. This type of metaphor is shown in the following Table 3.

Table 3.

Types of Metaphors with the Ground as Effective Prompt

List	Topic	Vehicle	Ground
A	Skyscrapers	are honeycombs of glass	(are partitioned into hundreds of small units)
B	Skyscrapers	are the giraffes of a city	(are very tall compared to surrounding things)

More than half of the subjects presented to a ground from list (B) recalled the sentence from list (A). The authors' explanation is that the ground is "so critical a property of the topic that it is likely to remain invariant and salient no matter what the context of interpretation " (Verbrugge & McCarrell, 1977, p. 505). A different explanation would consider the criteria of formulation. The possible environmental context is in both cases formulated with reference to semantic-logical classification, which is further underlined in the grounds. Why avoid alluding to the busy bees of the city instead of their static edifices? With the semantic constraint the structure becomes conceptually invisible, resulting in an invalidation of the relevant-irrelevant ground factor. Furthermore, if the ground of list (B) could prompt any of the sentences, it is rather because of its expression of one logical type, the height. Consequently, ground (B) may have had a pure orientation function and the vehicle of list (A) may have been the best choice. Apparently, this effect is not reported for the ground of the sentence of list (A).

The role of the vehicle

The prerequisites for the second experiment were that properties of the topic are primed or weighted differently in the presence of different vehicles. The aim was to test contextual familiarity by crossing three acquisition-lists (A, B, and topic-only) with two

grour.. sets. Two questions pertaining to each set of grounds could be (a) whether a ground would be less effective in prompting an isolated topic than a full metaphor with the relevant vehicles (the interaction model) or (b) whether it is more effective in prompting an isolated topic than a full metaphor with irrelevant vehicle (correct contra conflicting context).

Three groups of subjects listened to one of the list conditions but were this time asked to write down the "subject" (topic) of the original sentence (Lists A, B) or the "word or phrase" from the topic-only condition. The results show that it makes little difference to recall just topics or (topics + vehicles). If subjects can recall the topic, they will also be able to recall the vehicle. The authors, therefore, assume that the vehicle had primed the interpretation of the topic. High recall of topic-only occurred when the ground was salient or critical property of the topic, i.e., the same effect as was discussed in experiment one, only this time scored for all subjects. This effect confirms an alternative interpretation depending on constraining formulations. Therefore, it is most interesting to follow the authors' discussion on low recall of isolated topics.

It is generally assumed that non-recall of a topic has to do with the "relevant" context being conflicting without the guiding vehicle. Thus the ground for the seventh sentence "are tubes which conduct water ..." cannot prompt recall of "tree trunk" in any of the cases. And, further, in only just above half of the cases subjects could recall correct the topic of this sentence having heard the "tree trunk-straw" sentence when faced with the "tubes" Ground. The same result holds for the sixth sentence type whose ground is "tell you where to find business in the area". These results lead Verbrugge and McCarrell (1977, p. 514) into possible explanations of a "distinctive structuring of the topic domain for each metaphoric context in which the topic terms appear". The conclusion seems to be adapted to the view of metaphor as seeing the unfamiliar or at least the familiar in new ways. However, is this conclusion to be drawn from the actual results?

Returning to the formulation factor, there could be a possible explanation to the low recall of so-called conflicting contexts. Consider the seventh sentence once more:

Topic-only	*Ground*	
Tree trunks	are tubes, which conduct water to where it's needed	(17)

How salient is actually a tube a property of a tree trunk? Apparently, there is more structure in a tree trunk than in a tube, which implies that the event that shall be captured must necessarily take the opposite course in the transformation. It is unlikely that a highly structured concept may be accessed from a sort of lexical definition vocabulary.

The transferability assumption

The third experiment aimed at testing the function of the vehicle by questioning whether an original ("principled") metaphor is different from a produced one ("arbitrary"). In this experiment it would be assumed that prompting of recall should be equally effective no matter what topic a vehicle is paired to, since the properties and features of the vehicle are the focal points in comprehension. Topics and vehicles were randomly paired to produce new metaphors. Prompts were relevant grounds and subjects were asked to recall full sentences. Examples of arbitrary metaphors are the following:

Tree trunks are like dragons	(18)
Tree trunks are like babies with pacifiers	(19)
Cigarette fiends are warts on the landscape	(20)
Cigarette fiends are the yellow pages of a highway	(21)

The result shows that a vehicle in the principled metaphor provided for relevant prompted recall of the sentence compared to when appearing in an arbitrary metaphor. However, a "sizable fraction" of correctly recalled arbitrary metaphors could be found, interpreted as depending on close relationships between topics and grounds. Now, the authors explicitly refer to an asymmetrical relationship, which should validate the assumption of transferability originating from the vehicle.

There are not many examples to draw conclusions from without knowledge of the entire lists. But since Verbrugge and McCarrell continue to discuss "errors" as results of salient properties between grounds and topics or vehicles, this calls for a few comments on the way of perceiving the experimental materials. Two cases of such a mispath in comprehending metaphors are to our disposal. In the following example, these conditions are reconsidered:

Vehicle	*Environment*	*Ground*	
Warts	on the landscape	(are ugly protrusions on a surface)	(22)

A circumstance not discussed is the role played by the environmental context in prompting recall. As was pointed out in connection with the first experiment, only the environmental condition of the seventh sentence type was excluded from the vehicle prompts. The same care is not taken in the present case. Therefore, it is perhaps a simplification of the problem to mention only the "ugly protrusions" as enough for recalling the "warts" sentence. Moreover, would really nine out of ten subjects not perceive a saliency between warts and fiends?

The second error occurs with the arbitrary combination of "skyscrapers" (topic) and "branding iron" (vehicle) by which the ground "are very tall compared to surrounding things" is proposed to have influence on recall due to its being a salient property of skyscraper. Thus, it is taken as an exception from the assumption proved, that is, that no independence exists between topic and vehicle. But, once you have observed the setting sun reflected in the glass of a high-rise a branding iron is not far away. Finally, with respect to the influence of the formulations on recall of arbitrary sentences the authors report on a tendency of subjects combining two topics, for example:

Skyscrapers are billboards to a large city (23)

Thus, the example is a response to the correct "skyscraper" ground. It seems to fill the requirement of a good analogy. Although the authors deny it, there seems to be no great difficulty in integrating arbitrary combinations taken from their materials. The difficulty rather lies in constructing all combinations so as to make them truly independent.

The importance of experience

The fourth experiment tested the likelihood that subjects could recall relevant topics or vehicles when they read ground without having any experience with the acquisition sentence. This was performed as a sentence completion task. Correct recall would imply a decomposition of a structure into one of an unknown set of events or relationships. Here, it was sufficient to recall closely related words, e.g., "moles" and "pimples" for "warts", "beehives" for "honeycombs" or a certain specific case for the more general denominator.

Not surprisingly, a topic or vehicle must be heard before it can be produced. Also in this experiment some cases raise special discussion. The original vehicle was a frequent response to certain grounds: "warts" to "are ugly protrusions on a surface" and "yellow pages" to "tell you where to find business in the area". Similarly, the original topic "skyscraper" was frequent to its ground. The concluding explanation is drawn on "the most

salient instances of the relationship specified abstractly by the ground" (Verbrugge & McCarrell, 1977, p. 523). In what respect is "yellow pages" less abstractly specified than its ground?

Formulation of Events

The metaphor is an instrument for direct perception of events. This event structure is embedded in the ground of a metaphor, thus it is not only by coincidence that grounds are implicit in the linguistic manifestation. As James J. Gibson puts it, events begin and end abruptly, an observation being of great importance when making events visible, conserved or formulated. This is exactly what Polanyi and Prosch (1975, p. 79) point at in discussing the Richard II metaphor. To try to capture the event by explicating what makes up the sense of a metaphor makes it loose its power. "As a rule", the authors state "a metaphor loses its force even when transposed into a simile (Polanyi & Prosch, 1975, p. 79). It seems as if this is the general effect that can be read from the studies of Verbrugge and McCarrell.

There are apparent differences between media with respect to their possibility of capturing event structures. A simulation experiment discussed in B. Bierschenk (1978) used video scenes together with verbal descriptions, which had to run over a certain length in order for certain specific relationships to be conserved (Bierschenk & Bierschenk, 1986). The problem is particular crucial when an event shall be used as prompt. Rosch (1975) solved it by visualising the acquisition category as the colour and the prompt (prime) as the word for it.

One significant difficulty for Verbrugge and McCarrell is to know whether they have been able to demonstrate the comprehension of metaphors, and, consequently, whether they have been able to capture the structure in their ground specifications. This uncertainty is presumably due to an intuitive feeling of having lost the natural unity of the metaphor. Because, what they have actually studied is dependency between the components, and not their cooperation. By necessity, the structural unity gets lost through the experiment itself. Thus, some of the obvious decomposing tendencies in their variables have been pointed out, which seem to emanate from a confusion of higher order variable relations with implicit relations. From a transformational perspective on metaphoric comprehension and construction, the language level may carry specific cues to immediate effect. Consider the examples given anew in the Table 4.

Table 4.

Metaphoric Sentence Constructions

Metaphoric Sentence	Ground
Tree trunks are straws for thirsty leaves and branches	(are tubes which conduct water to where it's needed)
Tree trunks are pillars for a roof of leaves and branches	(provide support for something above them)

In Verbrugge and McCarrell's initial discussion on transformational and structural invariance it is assumed that an event could be characterised by either type or both. In the first ground example of Table 4, therefore, both should be present, namely, the "flow of fluid" and the "tubular structure" respectively, whereas in the ground of the second example, only a "solid column" is the remaining invariant. As for the second ground it is stated that the tree trunk, here, is represented as a different structure compared to the first ground, and further, that "structural primitives" (which by definition cannot exist) should not be regarded as substantial

in kind. In spite of this, nothing is mentioned about how the solid column becomes transformational.

With an ecological approach to the perception of events, the authors reveal a misconception of the discussed theory. Firstly, transformation exerts over both structure and form. Otherwise, one should have to distinguish between structural and formal (or logical) invariance. Secondly, an event is only perceivable through structure, so, to capture it means to conserve its structure by a form. Thirdly, in a metaphor, both structure and form must be present in both concepts, because, if not, it should not be possible to directly perceive the invariance. Consequently, if one concept contributes with form invariance only, a simile or analogy is likely to be to hand. It follows, that the interesting thing to try to capture in the process of transformation through metaphor is the asymmetry that lies in the way in which formal and structural properties are activated and brought to cooperation. With respect to the construction of metaphoric sentences and the formulation of the grounds, Verbrugge and McCarrell's examples show in what way a consistent de-structuring has taken place in the construction phase through a high influence from semantics and logics. The de-structuring co-varies with the language used.

A tree trunk and a straw both have structure. A tube has form, and the rest is function. Pillars have the same form but a different function. This is evident from the lexical entry "trunk", which may be used in the sense of, e.g., "pillar" or "tube", senses, which are derived from only the logical (lexico-semantic) part of the compound, in contrast to straw. Typically, straw is also used in so-called transferred sense ("the last straw", etc.). To explain in language the logics of a tube or a pillar require us to use linguistic elements, which can best specify a literal meaning. Tube as well as pillar are artificial constructs being given concreteness through the form and may therefore be perceived as closely related to a ground in the literal sense. Thus, the grounds in the examples of Table 4 should have identical formulations as to the language level suitable to express the environmental condition. With respect to function, tube may be perceived as having a more dynamic function than a pillar, which would be expected to show up in language.

When Verbrugge and McCarrell consider avoiding systematic intrusion, only "content words" are important to vary. The consequences are, for example, that "tubes" have gotten a more concrete (con)textual specification than "pillars", in the sense that "which conduct water" describes an action level, whereas "provide support" indicates more of an observational statement. The final noun phrases of the examples of Table 4 leave the same impression. "Something above them" and "where it's needed" differ in the sense that the first example is a purpose, i.e., closely inherent in the function of conducting, and the second states a goal, indicating that the "something" is not physically connected to the function.

Now, what may be questioned is not the consistency within each ground but rather the inconsistency between grounds of the same type. Why were not this type and its special function formulated something like "conductor of water" and "supporter" or (for the tubes) "provide conduction ..." (provide cannot be regarded as a content word)? Finally, the metaphoric sentences of Table 4 become examples of the structural-formal distinction (Becker, 1978). In a structural view of perception, leaves and branches may be thirsty, i.e., the dynamics of their ecological functioning is integrated in their description. In a static view, however, they become bricks of an edifice. And this is the sad lot of many events in the studies discussed here.

The cognitive-linguistic unity

Verbrugge (1977) in a further discussion on language and perception strives to connect to the Gibsonian attack on "immanent formism" (Gibson, 1982), although within the language of figuration: perception and articulation as figurative activity. Throughout the

reported experiments, analogies were talked about in terms of metaphors, whereas this time relationships are talked about in terms of symbolic analogies. For an ecological approach to the study of metaphors, however, it should be noted that the notions "affordance", "attention", and "orientation" are being crystallised as central to the puzzle of understanding the event of a metaphor. Yet, despite the fact that Verbrugge draws his discussion on a true metaphor, he may not have been aware of it, since his terms lead him only half way. The discussion is centred on the following example:

An empty prison cell is like a Venus fly trap, (24)
waiting for its next victim to enter

A prison cell and a Venus fly trap belong to very different domains and are usually involved in very different events. According to Verbrugge, the resemblance that they are brought to share are essentially figural. He explains the understanding of the essence of the resemblance as due to an act of imagination, which would serve as a sort of intermediary bridge from inferential to direct perception of structure at a higher level (Verbrugge, 1977, p. 378). Thus, it is this ability that may be used in specifying "wordly" the event perceived. Through a figural bridge these two examples would have the same affordance as the one above:

An enemy fortress is like the open mouth of a killer whale, (25)
when a fish accidentally swims in

An empty prison cell is like seeing a room through (26)
Venetian blinds

Starting with the last example, Verbrugge reports that our perception is "oriented" to the event and not to the bars on a cell window or the slats on Venetian blinds (which can be vertical or horizontal). The individual (like an organism's orientation in the environment) positions himself in front of the bars (blinds) and takes in the cell (room). Only, the problem is that prison cell and room converge into the same kind of spatial orientation, a frame in which some event is not specified. Following Verbrugge's earlier experimental results (Verbrugge & McCarrell, 1977), it is, namely, the vehicle that governs what relationship to be attended to. To capture some higher order relationship some psychologically valid abstraction must be perceived. For example, a prison cell should be much higher in affordance, if one imagines to oriented from inside out.

The "fortress-mouth" example is a far better description of some dynamical dimension of the "prison cell – Venus fly trap" example. It orients towards the act of kill and eat, happening in a dangerous place, although by chance. What reason is there to believe that the victim of a Venus fly trap enters by chance? Would it not be more fruitful to adopt the "teleonomic" view (Monod, 1971) and conceive the necessity and inevitable course of events being the identical structure of the prison cell and the Venus fly trap, for which there are also explicit cues, such as "empty" and "next"? Consequently, intentionality must be operating as well. If so, the interesting thing may be seen as to the formulation of the ground: it is self-contained, can be literally interpreted when pertaining to either concept. Thus, the divergent forms of the concepts are brought to cooperating structures through the ground, the very essence of direct perception of metaphors.

In an ecological model of metaphor the ground component denotes just what is not relative or personal, only the ecological significance. Anything else is groundless. However, as an instrument of cognitive transformation the metaphor would have to get the names of the other components changed to make them more functional. The invariance expressed in the

ground is arrived at through transformation. At the same time, this means that it does not only exist, but is directed in an abstract sense. To fulfil the transformation something has to give directive-ness to the intention. This is the function of the orientation.

Orientation in the cognitive sense denotes neither topological nor figural aspects, but rather it is the sense of meaningful behaviour, the proper denial of intransitivity. We propose therefore that tenor or topic is replaced with "intendor", and vehicle with "orientor", in the hope that this redefinition may give insight into new perspectives on the study of transformations.

Intendor and Orientor

It is a well-known fact that metaphors are central in the development of scientific hypotheses. This is particularly striking in Lorenz' approach, where he orients himself through the hydro-mechanical model in approaching species-specific behaviour. Despite the fact that this orientor has an immanent character, while the intendor is immaterial in nature, Lorenz has been able to generate many hypotheses of great value for theory development. His insight into the necessity of making the distinction between the conceptual and phenomenological dimensions of "behaviour" has led him to pick up the invariance of explosive events, which gave rise to the hypothesis of "Innate Release Mechanism". The distinction in Lorenz' language concerning model and phenomenon shows that concepts like "energy", "storing", "flow", "overflow", and "explosion" are theoretically unambiguous and well anchored in hydro-mechanics (Lorenz, 1950; Hinde, 1956)

In contrast to Lorenz' conduct to theory development, Tinbergen (1951) has chosen to represent species-specific behaviour in form of a model of hierarchically organised centra in the nervous system. Thus, behaviour is equated with representation with the understanding that it has to be explained in relation to the nervous mechanisms. The model assumes the existence of one-way causality between particular centra and species-specific movements. His language presupposes the existence of some accumulated reaction-specific energy in the organism. Moreover, it is postulated that a relation between internal inhibitory mechanisms and behaviour exists. Tinbergen's language describes behaviour as a set of states connecting construction of behaviour theories to electro-chemical (or biochemical) theories for which balance is central. As a rule, pattern – action or condition – action relations are postulated, implying that the purpose of species-specific behaviour is implicit and, therefore, needs not be sensitive to context. However, there is no empirical evidence for this existence postulate. Experiments with genetically encoded behaviour patterns (Immelmann, 1979) show that the environment in determinable ways influences the development of behaviour. Since "flow" in Tinbergen's theory is defined in terms of associations of sensitivity to behaviour and since no evidence exists for such an assumption, concepts such as "flow" as well as overflow" are theoretically empty.

The AaO as Building Block

In order to get hold of the intention and to keep it apart from the orientation, the metaphor of the example 7.7.5.1.1 were in the beginning of the 90's processed on the basis of the AaO-formula. This formula were developed into the following general expression

$(AaO)_n = (A_n \text{ a } O_n)$, where (27)

A-linkage = $A_n = Text/X/A_{n-1}/[A_{n-1} + O_{n-1}]$

O-linkage = $O_n = Text/Y/[A_{n+1} + O_{n+1}]$

Multiple linkage = $\{[AaO_n]\ a\ [AaO]_{n+1}\}_{n+2}$

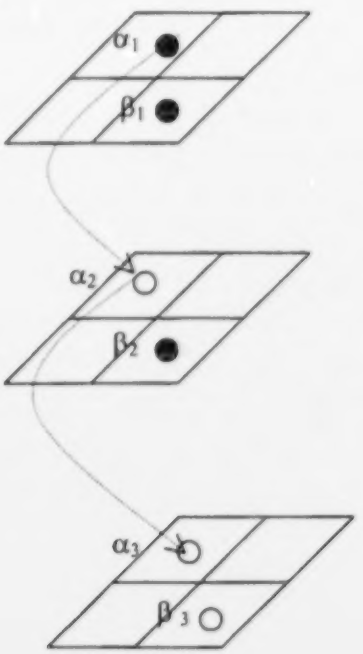
In general, any string of letters or part of a clause has been defined as a conceptualisation of an observation if all three constitutive components are present. In principle, An A-dummy is substituted with the immediately preceding textual agent $[A_{n+1}]$-dummy. If the dummy is language specific (e.g., the string 'it') the immediately preceding clause $[A_{n-1} + O_{n-1}]$ is the substitute. The O-dummy is substituted with the immediately succeeding clause $[A_{n-1} + O_{n-1}]$. The linkage mechanism illustrates how the AaO-axiom guides and controls the development into an algorithmic procedure characterising the functional, structural and dynamic aspects of a text. Processing the text of the metaphor (24) with the package of programs, existing in the early 90's, had resulted in the encoding, reproduced in Figure 2.

The hypothesis behind this approach is that functional distance can be related to the grasping of metaphorical invariants. However, to discover the roots of a metaphor necessarily means that these distances must be made evident. Thus the functions will become manifest only to the degree that the space of its pronunciation can be reconstructed. Unquestionably, the essential operator-function in this process is identical with the verb-function, which is determining the operations of the AaO-mechanism. Without the identification of a verb, it is impossible for the algorithm to disclose the perspective. The copula ('is') has traditionally been assigned the task to connect a main word with an attribute in a symmetrical relation. In contrast, the algorithm recognises ('is') in the same way as any other verb in a directed, i.e., asymmetrical relation.

Figure 2.

Development of Functional Distance by Means of Imperfect [AaO]

Evolution	*Development Text*	*Change in Twisting*	*Twining*
A_1	An empty prison cell		
a	is		
O_1	like a Venus fly trap		
	,		
A_2	∅		
a	waiting		
O_2	for its next victim		
to			
A_3	∅		
a	enter		
O_3	∅		



Clearly, Figure 2 shows that perfect as well as imperfect [AaO] are appearing in the processing of the metaphor. What is missing in the conventional analysis of metaphoric sentences is the AaO-formula as foundation for describing its transcendental logic. It affords the textual elements to be identified and processed by a coherent functioning mechanism. This is achieved through the distinction of the A-component as starting point of an action and its separation from its objectives. The older version of the algorithm made a distinction between the variables (β_1, β_2). The mechanism did execute its work by searching for the objectives and by classifying them into four different classes. The second variable were treated as belonging to the Goal-class and therefore separated from the others. Since this variable extends the scope it represents a setpoint. Further the β_3-variable is a priori unknown.

But on the basis of identified groupings, substitution of the β_3-variable with (Y) were made possible. To repeat, foliation is dependent on the degree of differentiability of the textual elements. Since Ward's clustering algorithm (Ward, 1963) has been used, the basis of grouping consisted of a linear separation of grapheme properties. However, later developments made evident that slightly differentiable elements lead to identical groupings. In this case, it is obvious that the resulting differences are caused through the spacing of the elements in the data-matrix. This kind of problems has been circumvented through the introduction of relative complex properties, namely the separation of textual elements based on some pre-classifications. However, this kind of "typing" of textual elements is of limited usefulness. For example the Figure-class had to control the viewpoints "Venus fly trap" and "Y". It follows that these two viewpoints formed a "natural group", whose prototypic character were the result of classifying textual surface properties before sorting them into natural groupings. Their contents are easily scrutinised and comprehended as "Trap" and "Victim". Hence, the unknown viewpoint (Y) of the equation of the metaphor has been solved as [Y = Trap]. The implied loss of information concerning its exact positioning is producing potential ambiguity. The β_3-variable of the Goal-class gave rise to the other and were named "Victim". Since a class is disposing information on the position of a particular variable, a group can only be conceived of as characterisation of the initial state of the process and thus as source for the prototypical naming of the terminal states of a structure. As a result, in the 90's it was only possible to demonstrate that the terminal states of a metaphor could be named (B. Bierschenk, 1991).

Foliation as Prerequisite for a Functional Distance Analysis

The reason for using the metaphor once more, but now in the establishment of an attractor space is firstly that it can be studied and discussed with respect to conceptual borders, residing in the metaphor itself. Further, conceptual borders can be related to obvious "contextual constraints". Secondly, the functional symmetry of a metaphor can be reflected through rotational distances and represented as convoluted space relations. Thus, coupling configurations, related to neighbourhood, prevent ambiguity, because time-dependent coupling, speed and reversible covalent interface smoothness are generating novel fitness conditions for the production of the landscapes of the source spaces.

This novelty is the result of the connection dynamics of the AaO-systems, which is superior when compared with the functional architecture of classical clustering with Ward's algorithm. How differences in the degree of articulation have constraint the behaviour of the individual variables of Table 5 is demonstrated in the Figures 3 and 4, which were produced with SigmaPlot (2002). The result of the processing of the metaphor (24) is reproduced in its entirety, since it exhibits a particular kind of elasticity.

Table 5.

Spherical Dependency of Layered Composites

Text	Radians	Sum	Supplementation
An	0.32028		
Empty	0.32970		
Prison	0.33284		
Cell	0.32656	$\alpha_1 = 4.449380$	
Is	0.32028		
Like	0.32656		
A	0.31714		
Venus	0.32970		
Fly	0.32656		
Trap	0.32656	$\beta_1 = 5.086800$	
,			
$\varnothing_A$	6.05550	$\alpha_2 = 3.945655$	(An empty prison cell)
Waiting	0.58850		
For	0.56650		
Its	0.56650		
Next	0.57200		
Victim	0.58300	$\beta_2 = 8.376500$	
To	0.56100		
$\varnothing_A$	6.06100	$\alpha_3 = 1.490954$	((An empty prison cell))
Enter	0.47100		
$\varnothing_O$	0.00000		(Y)
.	0.34540	$\beta_3 = 0.816400$	

Text resulting from the working of non-linear language mechanism must exhibit non-commutative elasticity, which means that the elasticity of a text is not constant but increasing with increasing degrees of perspective deformation. When the metaphor is treated as a self-contained system, the thermodynamic limit of its states can be determined through the "Connes-fusion".

The resulting space corresponds to the discovery of a progressive continuation in the branching of a foliation. Although a super-string is by definition symmetric, individual rotations and fluctuations can exhibit striking differences concerning a component's acceleration in speed and establishment of distance. Differences in propagation may have markedly different effects on the development of a depth-relation in the hyperbolic space of a metaphor. The configurations of the established spaces demonstrate the achieved depth-relation.

As shown in Figure 2, seeing the depth of the metaphor means adopting Monod's teleonomic view. Moreover, to see Monod's "necessity" means to see the *"Inevitable Course"* of the events beyond the identical structure of the prison cell and the Venus fly trap. Taking into account the inevitable of confinement, it can be stated that the O-function brings about the unavoidable captivity through the following relationship:

$$\left.\begin{matrix}(S_1)\ \text{For its next victim} \\ (S_2)\ \text{The Venus fly trap}\end{matrix}\right\} \left.\begin{matrix}(T_1)\ \textit{Inevitable Course} \\ (S_3)\ (Y)\ \text{unknown}\end{matrix}\right\} (T_2)\ \textit{Fate}$$

The transformational steps through the states allow for the emergence of the property of "an empty prison cell" in terms of the "victim's" lot in life. Hence the depth of the metaphor is the victim's *"Fate"*. When the instrumental function of the metaphor has worked as intended, the unknown (Y) of the third state has become known, and the invariant *"Fate"* may be experienced as "striking familiarity" or a "flash of insight". It is this kind of functional quality, which has been made explicit by the O-function.

As shown in Figure 2, the Agent-function concerns the processing of a different number of propagating states ($^2\Pi$), which are resulting in two re-markings on the following path:

$$\left.\begin{array}{l}(S_1)\ \text{An empty prison cell}\\(S_2)\ (\text{An empty prison cell})\end{array}\right\}\ \begin{array}{l}(T_1)\ \textit{Inevitable Course}\\(S_3)\ ((\text{An empty prison cell}))\end{array}\ \left.\vphantom{\begin{array}{l}a\\b\end{array}}\right\}\ (T_2)\ \textit{Fate}$$

As shown in the path, processing this kind of drifting in the A-function can be completed only if the missing textual agent becomes accessible. In Figure 4 it has been demonstrated how the two markings are influencing the distance in a relation. In general, strongly propagating components are an expression for a high degree of rotational dislocation and the production of highly individual spaces. However, the effects of the metaphor shown in the Figures 3 and 4 are in fact quite similar in that all rotations peak near their information limit (Fate). As a result, Figure 4 shows that the discontinuities in speed of its rotational pattern dynamics can be captured. Despite the slightly asymmetrical appearing configuration of the A-function, this function resembles structurally the informational limit of Figure 3, namely the global state attractor *"Fate"*.

Discussion

The discussion of the classical approaches to the comprehension of metaphors has shown that it is difficult to define metaphorical quality. The reason for the shortcomings of the conventional strategies seems to be associated with the effects of implicit figuration and subjective interpretation. In contrast, the demonstrated capacity of the AaO-mechanism to process a metaphoric expression successfully has made it evident that the cooperation between intention and orientation as well as the effects of rotational dynamics leads towards the metaphysical determination of metaphors. This means that the functional quality of a metaphor can be manifested and tested through the production of informational invariants.

Since the idea behind the fourfold arrangement of Figure 1 has been that the instrumental aspect of any metaphorical expression is transcending various contextual constraints, it has been assumed that it is possible to capture the metaphysical properties of the involved A- and O-functions. Moreover, it has been shown that the equations of metaphorical expressions, using familiar words in non-familiar fashion, have the capacity to transcend textual constraints and to pick up the metaphysical property of a textual expression. In solving this kind of equations, the mechanism is providing for the establishment of a particular functional quality. In this sense, thermodynamically produced constraints put new kinds of stress (shear, strain) on the controlling functions of the metaphor. It follows that the inherent transformations of the metaphor (made explicit in the verbal flow of Fig. 2) is reflecting the underlying functional distance.

Figure 3.

The Convoluted Space of the Objective-function of a Metaphor

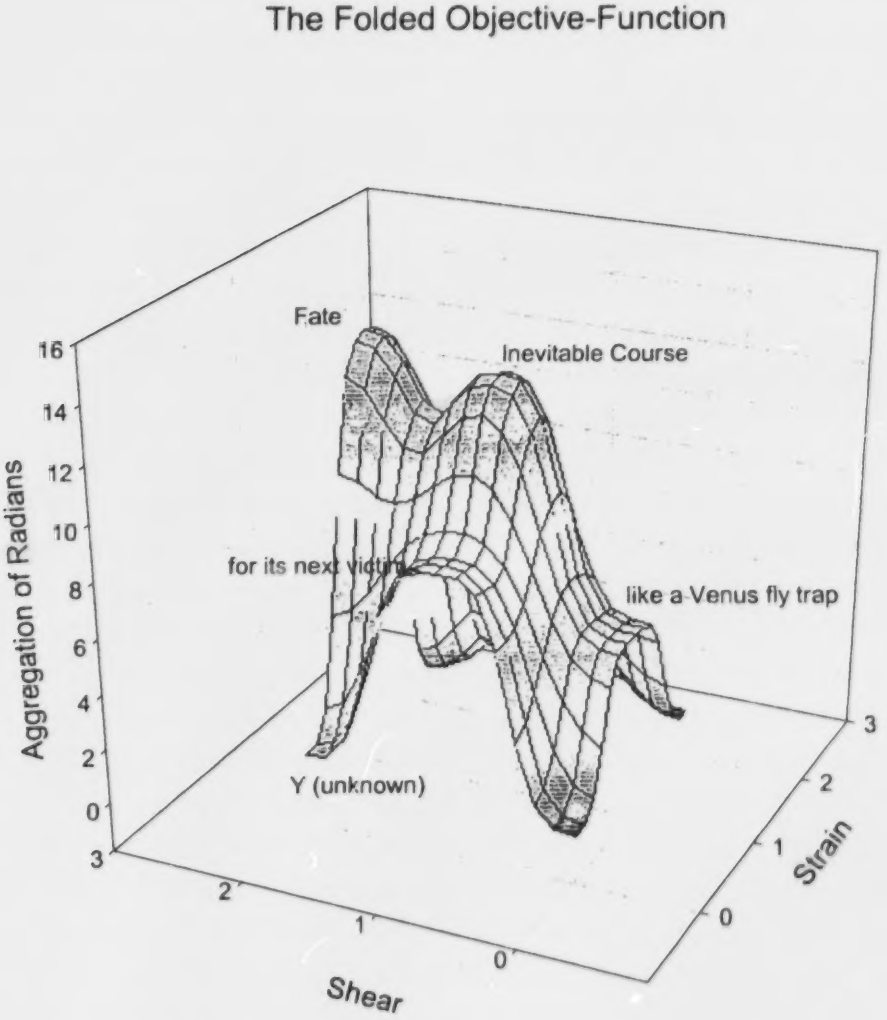


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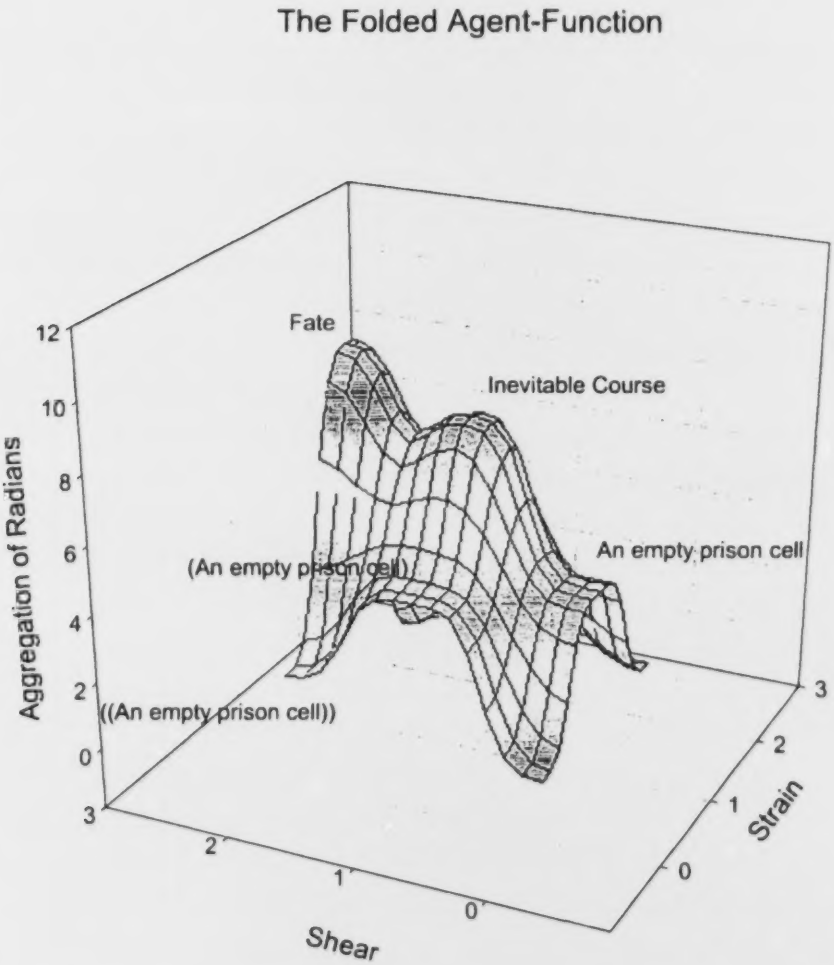
Figure 4.

The Convoluted Space of the Agent-function of a Metaphor



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Thus, the mechanism (27) constitutes the basis for a graphical reproduction of the double asymmetry, which has established the symmetry between the A- and the O-function. Since their metaphysical spaces have appeared to be roughly symmetric, it can be concluded that the A-function in the studied metaphor is systematically related with the identified O-function. However, to establish the metaphysical space of a language expression, any metaphorical expression has to fulfil its transcendental function. As a consequence, the intentional contextualisation of words that fuzzes their lexical specifications has to be directed towards "formless invariants" that exist above and independent of material experience. What is directing intention to pass beyond the limits of reality is the function of orientation. But orientation denotes neither figurative nor topological aspects.

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